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AUTHOR Cooper, C. Crys
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ABSTRACT

The experiences of novice users (freshman students at Ohio University) searching OCLC's FIRSTSEARCH set of databases were studied. The 13 subjects were asked to complete a search on the FIRSTSEARCH databases; and data were collected through observations, administration of a questionnaire, and a thinking-aloud protocol. Data were analyzed to describe and categorize the subjects' experiences with the user interface. Results indicate that the novice user found the FIRSTSEARCH system user-friendly, with an average approval rating of seven out of nine on the Questionnaire for User Interface Satisfaction (QUIS) developed at the University of Maryland to measure human-computer interaction. Eight tables present study findings. Two appendixes contain the script for recruiting volunteers and a transcript of the search observations. (Contains 21 references.) (SLD)

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A QUALITATIVE STUDY OF NOVICE USERS OF FIRSTSEARCH ON THE IBM

A Master's Research Paper submitted to the
Kent State University School of Library and Information Science
in partial fulfillment of the requirements
for the degree Master of Library Science

by

C. Crys Cooper

May 1993

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Master's Research Paper by

C. Crys Cooper

B.S., Ohio University, 1981

A.S., Santa Fe Community College, 1982

M.L.S., Kent State University, 1993

Approved by

Adviser_____ Date _____

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THE USER INTERFACE OF FIRSTSEARCH ON THE IBM: A QUALITATIVE STUDY ON NOVICE USERS

This study examines the experience of novice users (freshmen Ohio University students) searching OCLC's **FIRSTSEARCH** set of databases. These subjects were asked to complete a search on the OCLC's **FIRSTSEARCH** set of databases, and data was collected via observation, questionnaire, and a "think-aloud protocol". Data was analyzed to describe and categorize the subjects' experience with the user interface. The results of the study indicated that the novice user found the **FirstSearch** system user-friendly with an average approval rating of 7.0 out of 9 on the **QUIS** questionnaire rating human-computer interaction.

ACKNOWLEDGEMENTS

I would like to thank my friend and classmate Patricia Thomas for her literature review of Computer:User Interface Assessment which had considerable influence on the conceptualization of this project. I would also like to thank my advisor Dr. Carl Franklin of the Kent State University School of Library and Information Science for his guidance and encouragement during the period of my graduate studies and for his invaluable help in the generation and construction of this research paper.

FIRSTSEARCH

FIRSTSEARCH is a set of Online databases offered by the Ohio Online Computer Library Center (OCLC), to member libraries at a reduced price per search. The databases contained within **FIRSTSEARCH** are:

> OCLC Online Union Catalog, ERIC, GPO monthly catalog, Consumer Index, MiniGeo Ref, Biosis/FS, Readers Guide to Periodical Literature, Periodical Abstracts, Readers Guide Abstracts, Newspaper Abstracts, Humanities Index, Business Periodicals Index, Wilson Business Abstracts, PAIS Decade, Biography Index, PsychFIRST, SocioAbs, BusinessOrgs, Disclosure Corporate Snapshots, Fact Search, Book Review Digest, Cumulative Book Index, Art Index, Essay and General Literature Index, Business Organizations, Agencies and Publications, Education Index, Index to Legal Periodicals, Library Literature, Social Science Index, Applied Science and Technology Index, Biological and Agricultural Index, Concise Engineering Index, and General Science Index.[1]

The basic set-up is one in which libraries may purchase blocks of searches at reduced prices. The price of the searches is on a sliding scale with the cheapest rate being 45 cents per search for the largest number of searches purchased (80,000 searches) and the most expensive, 90 cents per search when only 500 searches are purchased. Searches can be performed from personal computers, public access computers or OCLC workstations and the set-up is

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[1] O'Leary, Mick. Database Review, "FirstSearch Takes the Lead", Information Today, February, 1992.

designed to augment existing libraries offerings to the patron.[2]

There are numerous benefits to **FIRSTSEARCH** compared to just buying time for online database searching, such as--extensive, no cost "help" functions which facilitate successful searching by the novice or amateur, easy-to-use search features/directives, searching any record field, limiting by date, record type, etc., and index expansion. The computer:user interface is designed to be easy-to-use and easy-to-follow.[3] Results from the searches are displayed in truncated form for browsing by the end-user, full record display is available for desired records chosen.

The main problems which have been noted by both end users and the designers of the system are--the seemingly long wait for displays to be brought-up, the truncation of titles, and the one-by-one full record displays which require a great deal of end-user time to be reviewed or downloaded.[4] What has not been demonstrated yet is the "user-friendliness" of the computer:user interface in the working environment of OCLC-member libraries which have subscribed to **FIRSTSEARCH** because it appears to be a good investment and a beneficial service to its patrons.

During an active search with a "user-friendly" computer

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[2] Gupta, Usha and Lutishoor Salisbury. "Is FirstSearch Really Attractive", College and Research Libraries News, vol. 53, no.7 p. 461-368, July/August 1992.

[3] Campbell, Nancy, "FirstSearch Catalog Introduced", p. 19-28, OCLC Newsletter September/October 1991.

[4] Benefiel, Candace R. and Steven Smith, guest columnists, "FirstSearch: A Survey of End-Users", p.16-18, OCLC Micro, December 1991.

interface, a client/end-user will often formulate and modify their search-strategy in mid-search almost without being aware of what is occurring due to the help the interface and search program generates as cues to the user. Their grasp of the needs to formulate and modify the search increases as they find information pertaining to their data requirements via positive feedback (relevant information) from appropriate search commands[5]. To mediate any lack of search success in electronic bibliographic access, search strategies and interface capabilities need to be modified to cover as many contingencies as possible in indexing structure, this modification can be learned through experience or through bibliographic instruction. There is always a need for improving the indexing methods for bibliographic access to better meet information retrieval needs.[6] There is also need for a continuous assessment of how the user perceives and how the user utilizes the information accessing product.[7] How well the computer:searcher interface fits the needs of a novice searcher is

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[5] Dalrymple, Prudence W., "Retrieval by Reformulation in Two Library Catalogs: Toward a Cognitive Model of Searching Behavior". Journal of the American Society for Information Science, 41 (4): 272-281, 1990.

[6] Stoan, Stephen K. " Research and Information Retrieval Among Academic Researchers: Implications for Library Instruction", Library Trends, Vol. 39, no. 3, p. 238-257, Winter 1991.

[7] Efthimiadis, Efthimis N. and Stephen E. Robertson, "Feedback and Interaction in Information Retrieval", p. 257-272 from Perspectives in Information Management, London, Butterworths 1989.

not well understood.[8]

Now that **FIRSTSEARCH** has made possible direct public access to online databases at highly reduced charges, what is needed is an examination of how **FIRSTSEARCH** is received and how it is being used by the public.

PROBLEM STATEMENT

There have been great advances in electronic bibliographic information retrieval in the last ten years--CD-ROMs, Online services, and now OCLC's **FIRSTSEARCH** set of databases. **FIRSTSEARCH** is an online service aimed primarily at CD-ROM searchers who desire more currency in their retrievals.

User satisfaction with CD-ROM's is rated high, yet studies have shown that training and experience are required to achieve the full potential use of the product. Despite this, users feel that they need neither training nor instruction for proper CD-ROM use.[9] Most CD-ROMs are marketed for use by a novice or inexperienced searcher and come with an interface designed to address common problems in the hope that it will increase search success and provide useful information for future product design. The same can be said for a product like **FIRSTSEARCH**.

FIRSTSEARCH needs to be critically tested for product

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[8] Logan, Elisabeth, "Cognitive Styles and Online Behavior of Novice Searchers", Information Processing and Management, Vol. 26, No. 4, pp. 503-510, 1990.

[9] Somporn, Puttipithakporn, "Interface Design and User Problems and Errors: A case Study of Novice Searcher:, RQ 30 (Winter 1990): p. 196.

effectiveness, practicality, and user satisfaction potential within the scope of other electronic information retrieval. It is up to the originator of an information access product to refine that product to meet user needs and should not require extensive computer experience to operate. There has to be critical analysis of the computer interface and how it relates to user satisfaction to keep the product viable in the information access market.[10]

LITERATURE REVIEW

Patricia Thomas has put together an excellent literature review on user interfaces and this section draws heavily on her work.[11] Alan Kay has done much of the preliminary research on the computer interface: user relationship. He admonishes designers not to merely mimic the use of paper information access means to the software interface, but to formulate "user illusion".[12] He stresses that an interface should be so easy that even a computer-innocent child could understand it. Even "user-friendly" interfaces require that the users be identified and catered to, so that in actual use, some interfaces may be extremely user-friendly to an experienced user but hard to work effectively to a completely

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[10] Zink, Steven,"Toward More Critical Reviewing and Analysis of CD-ROM User Software Interfaces, "CD-ROM Professional 4 (January 1991): 16-22.

[11] Thomas, Patricia, "The User Interface of ERIC on the Macintosh: A Qualitative Study of Novice Users", Master's Research paper, Kent State University at Kent, Ohio, 1993.

[12] Kay, Alan. "User Interface: A Personal View," chapt. in The Art of Human-Computer Interface Design, ed. Brenda Laurel, 191-207. Reading MA: Addison-Wesley 1990.

novice searcher.[13] Perhaps "user-friendly" should be replaced by "intuitive" to describe software which is self-explanatory.[14]

Shneiderman lists eight basic underlying principles of good interface design:

1. Strive for consistency
2. Enable frequent users to use shortcuts
3. Offer informative feedback without confusing error messages
4. Design dialog to yield closure giving users a sense of accomplishment and indicating the time to prepare their next actions
5. Offer simple error handling, telling the user how to correct the error that occurred, not just that it occurred
6. Permit easy reversal of actions
7. Support internal locus of control: "make users the initiator of actions rather than the responders"
8. Reduce short-term memory load by using the screen to display frequently needed information.

There has been no quantifiable means by which to measure "user-friendliness" and good interface design with the end-user in mind. Shneiderman lists five measurable human factors for evaluation:

1. Time needed to learn
2. Speed of performance

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[13] Nicholls, Paul, and R. Van Den Elshout, "Survey of Databases Available on CD-ROM: Types, Availability and Content", Database, 13 no. 1, (1990): p. 18-23.

[14] Helgerson, Linda W. " Some Techniques for Observing Users," In The Art of Human-Computer Interface Design, ed. Brenda Laurel, p. 85-90, Reading MA: Addison-Wesley, 1990.

3. Rate of errors by users

4. Subjective satisfaction

5. Retention over time[15]

This study concentrates on items three and four of this list. The remaining evaluation factors are outside the scope of this study. Further studies will help in the quantifying and refining of this list.

Qualitative analysis (also identified as ethnography, naturalistic inquiry, case studies, fieldwork, field studies, and participant observation)[16] is helpful in studying phenomena in which the end-result is to describe what exactly is happening through the course of the interaction. These methods are especially applicable to evaluate library applications when the presence of a technology is meant to augment existing services rather than totally replace them. The purposes of qualitative studies is to describe and understand normally occurring events and not prediction, control, etc. as in quantitative experimentation.

Triangulation will be employed to guard against subjectivity and researcher bias which are inherent in much qualitative work. In this study, triangulation employs three means of addressing the measurement of a single occurrence so that any bias is averaged out. The approaches employed here are-- direct observation, think-

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[15] Shneiderman, Ben. Designing the User Interface: Strategies for Effective Human-computer Interaction, Reading, Mass.: Addison-Wesley, 1987.

[16] Donald, Ary, Lucy Jacobs, Asgar Razevieh, Introduction to Research in Education, 4 th. ed., (Fort Worth: Holt, Rinehart and Winston, Inc., 1990), p. 444.

aloud protocol, and a questionnaire. All of these techniques are standard measures employed in qualitative analysis and have proven to be satisfactory.[17] The questionnaire employed will be "The Questionnaire for User Interface Satisfaction (**QUIS**)" which was developed by the Human-Computer Interface Laboratory at the University of Maryland specifically to measure user satisfaction with the interface of the computer software.[18]

RESEARCH QUESTION

In qualitative research, there is no hypothesis but rather a research question. The research question here is how effective is the **FIRSTSEARCH** user-computer interface.

METHODOLOGY

This study employed qualitative techniques to document the experience of novice end-users when searching **FIRSTSEARCH** at Ohio University. No claims of generalizability are made. Case studies are used to assess the **FIRSTSEARCH** user interface.

Sample: This study used volunteer subjects from the freshman class at Ohio University. This is a purposive, non-probability sample where the volunteer group is judged to be typical of novice users.

Instrumentation: Triangulation of data collection was used to

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[17] Connell, T., 1991, "Library Subject Searching in an Online Library Catalog: An Exploratory Study of Knowledge Use", (Doctoral Dissertation, Univ. of Ill. at Urbana-Champaign).

[18] Shneiderman, Ben.

reduce researcher bias. The three methods employed were--systematic observation, think-aloud protocol, and a questionnaire. The search question used for all thirteen samples was the same.

The think-aloud protocol is a method of data collection whereby subjects are asked to engage in their normal pattern of activity, but to verbalize their thoughts as they occur. The only response of the researcher is to encourage the subject to think aloud should they lapse into silence.[19]

Procedures and Design: This qualitative study used a small group of student volunteers from the freshman class from Ohio University who were given a search question to be used on **FIRSTSEARCH**. Each individual session lasted about one hour and participants were informed that time was not an issue. A script (see Appendix A) will be used to decrease variation in administration of session. The subjects were informed that their session would remain confidential and that software was being judged, not their performance. They were advised that they could stop the session at any time should they feel uncomfortable. Materials on hand were the **FIRSTSEARCH** catalogue and notebook and the **FIRSTSEARCH** user guide. Questions were solicited before and after, but not during search.

The researcher was seated in view of the volunteer. The volunteer's use of sources, and non-verbal behaviors were noted. At the end of the search session the QUIS questionnaire was

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[19] Patton, Michael Quinn, "Qualitative Evaluation Methods", Beverly Hills, Sage Publications, 1980.

administered.

Sign-up sheets were placed both at the Reference Desk and in the Student Meeting Room in Alden Library at Ohio University in Athens, Ohio. There were no students signed-up on the sheet located in the Student Meeting Room, but there were fourteen names listed on the sign-up sheet located at the Reference Desk. Attempts at contacting all fourteen were made but only thirteen agreed to participate in the study. Students were asked when in the coming week they would be available to spend about an hour in the library using **FirstSearch**.

The appointments were made and kept, except for two instances when the students forgot they had prior commitments and had to reschedule their search time. The appointments were all in the afternoon, usually two or three/day. The students were all on time. They were greeted and given oral and written directions concerning basic computer use (i.e. "Return" signals the computer to carry-out an action/command, direction arrows for moving around the screen, etc.) and the general directions included in the consent packet. Students were asked if they had any questions after each phase of the administration of the preceding sheets or on the upcoming computer searching. Questions were answered and then the search question was given and explained as to what was desired in the search process and results. The search question was as follows: "I am concerned about obesity in young people. What is the current thinking on teaching young children (preschool and kindergarten through third grade) about nutrition and exercise?"

Once the Search for this information was begun questions were discouraged and not answered. After the search, the volunteers were asked if they had any questions, if there were any the questions were answered, then the questionnaire was given. After the questionnaire was filled-out the novice searcher was asked informally how they perceived the **FIRSTSEARCH** system and the search appointment was terminated.

Data from the visual observation and "talk-aloud" tapes were integrated to give both oral and visual explanation as to what was occurring as the search progressed (see Appendix 2). General problems in the search were enumerated and tabulated. The questionnaire was scored and a group count and sub-group tallies were arrived at.

Data analysis: included description of users, their background and their past experience with searching. The think-aloud protocols were compared with each other and with the data gleaned.

SIGNIFICANCE

This study aids in the assessment of the interface used in the **FIRSTSEARCH** set of database. This may help OCLC refine and further develop their product.

RESULTS

Of a total of thirteen searchers 31% had problems with typing in the password correctly with no screen feedback as to correctness of typing, 8% had problems with typing in the authorization code.

In the search process 54% had problems in typing in the search

phrase correctly, but these error(s) could be corrected by reading the screen and then backspacing to make corrections. However 31% encountered a 'glitch' or problem in the system in which the system would not backspace and the searcher would have to log-out of the system and restart-up on a totally new search. Printing caused the most confusion and took the most time. There were numerous keying errors but those could be remedied. All volunteer searchers completed this process.

Table 1.1: **PROBLEMS**

		COUNTS	PERCENTAGES
LOGGING-IN			
typing:	password	4	31%
	authorization	1	8%
topic area choice		4	31%
SEARCH			
Correctable		7	54%
Non-correctable		3	23%
Punctuation		1	8%
PRINTING			
Failure to achieve		0	0%
Miss-cued*		10	77%

*(i.e. wrong keys punched)

ANALYSIS OF RESULTS

LOGGING ON-- The main problems which occurred in the logging-on process were mistakes in typing or the keying in of characters. In novice users who have limited experience on a typewriter or keyboard, this is a logical mistake. Of course the **FIRSTSEARCH**

protocol having the passwords and personal authorization codes masked on-screen may improve secrecy, but does not help a novice typist or keyboard-user read their screen for typos and missed keys. Since **FIRSTSEARCH** is used on a personal computer station where semi-privacy exists, the need for protocols and keying measures insuring such high degrees of confidentiality, personal control, and secrecy may not be a high priority if it causes problems in time usage and frustration in users logging-on to the system.

TOPIC AREA-- The choice of topic area seems to be a problem of users who were not acquainted with the search question concerning obesity and youth. Rather than attempting to further modify my subject population by requesting only for freshman majoring in anthropology, health sciences, or sociology (the subject/major area within in which the search question would probably fall), the experimenter chose to maintain a subject group of novice users of undetermined background and knowledge area. Matching of search question topic area and subject background in determining searching effectiveness was beyond the scope of this study. Volunteers for this research project were all given the same question with which they had had no previous acquaintance. Because of this lack of knowledge concerning the search question they basically had no framework on which to make a choice in subject area or database selection. This facility of search refinement is enhanced by use and familiarity with the system, familiarity with the desired subject matter, and/or more acquaintance with a list of the

database descriptions. Novice users just have an innate disadvantage in this area.

SEARCHING-- Within the search process itself, the main problems encountered were difficulties arising from the typing or keying-in of characters from the keyboard. Perhaps the use of a mouse and "windows" for command choices would eliminate some of these keying problems. No Macintosh computers were available at Ohio University's Alden library to test this idea. This is another area where the novice searcher/computer user has an innate disadvantage over the typist or well-versed computer user. The main problem arose when the system would not allow backspacing to correct perceived typing errors. Since this lack of correctability arose only 43% of the time when typing or keying mistakes occurred, it seems to be a 'glitch' in the system. This problem will have to be handled wherever the difficulty originates, either locally or at the **FIRSTSEARCH** site.[20]

ANALYSIS OF QUIS QUESTIONNAIRE

The QUIS questionnaire was administered to all thirteen volunteer searchers, and all thirteen completed the questionnaire. This researcher used past experience on computers as an automatic categorizing method. Amount of computer experience was used to form groups because the degree of facility of use may influence how a user responds on the QUIS questionnaire. Although most of the

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[20] Snure, Karen, "The FirstSearch Experience at the Ohio State University", Library Hi Tech, issue 36-9:4, p.31 , 1992.

thirteen had had some computer use, none had any experience with online or CD-ROM searching. The following table lists the total numbers and percentages per group and for the entire volunteer subject group.

One volunteer (Group 1) had a total of experience on 7 different forms of computer software, hardware, and other devices in their computer experience. The next subgroup (Group 2) had experience with a total of 13 different computer software, hardware and other devices. Another group (Group 3-4) consisted of four volunteers who had had 3-4 types of computer systems in their experience repetoir. They had diverse experiences of different devices on these systems for a total of 17 forms of computer software, hardware and other devices in their experience. There was one volunteer novice searcher (Group 5-6) who claimed to have experience on 5-6 computing systems with an acquaintance of a total of 10 computer software, hardware devices, etc.

Table 1.2: **PAST EXPERIENCE**

PAST EXPERIENCE	GROUPS 1 N	1 %	2 N	2 %	3-4 N	3-4 %	5-6 N	5-6 %	%
Keyboard	1	7.7	7	53.8	4	30.8	1	7.7	100
Numeric Key pad			2	15.4	3	23			38.5
Mouse	1	7.7	7	53.8	4	30.8	1	7.7	100
Light Pen									
Touch Screen			1	7.7	1	7.7			15.4
Track Ball					1	7.7	1	7.7	15.4
Joy Stick			4	30.8	2	15.4	1	7.7	53.8
Text Editor									
Word Processor	1	7.7	4	30.8	4	30.8	1	7.7	76.9
File Manager					1	7.7			7.7
Electronic Spreadsheet			1	7.7	1	7.7	1	7.7	23.1
Electronic Mail					2	15.4			15.4
Graphics Software	1	7.7			2	15.4			15.4
Computer Games	1	7.7	4	30.8	3	23.1	1	7.7	76.9
Color Monitor	1	7.7	4	30.8	2	15.4	1	7.7	61.5
Time-share System									
Workstation									
Personal Computer			5	38.5	4	30.8	1	7.7	69.2
Floppy Drive	1	7.7	7	53.8	4	30.8			92.3
Hard Drive			4	30.8	4	30.8	1	7.7	23.1
Compact Disc Drive			1	7.7	2	15.4			15.4

Taken as a group these volunteers are assumed to be representative of any and all novice **FIRSTSEARCH** searchers.

The ratings on the questions of the QUIS questionnaire can be assumed to be indicative of responses of novice searchers encountering the **FirstSearch** set of databases system.

Table 1.3: **OVERALL USER REACTIONS**

Question	Rating										Group
	1	2	3	4	5	6	7	8	9	N.A.	
Overall Reaction to system								1			1
terrible...wonderful					2	1	2		2		2
					1	1	2				3-4
						1					5-6
					3	3	4	1	2		Total=13
frustrating...satisfying									1		1
						2		3	2		2
				1			2	1			3-4
					1						5-6
				1	1	2	2	4	3		Total=13
dull...stimulating								1			1
					3		3		1		2
				1	1		1			1	3-4
					1						5-6
				1	5		4	1	1	1	Total=13
difficult...easy									1		1
				1			1	1	4		2
						1	2	1			3-4
				1							5-6
				2		1	3	2	5		Total=13
Inadequate power...Adequate power									1		1
							4	1	2		2
					1			2		1	3-4
								1			5-6
					1		4	4	3	1	Total=13
rigid...flexible							1				1
					1		3	2	1		2
				2		1		1			3-4
						1					5-6
				2	1	2	4	3	1		Total=13

The ratings of Group 1's Overall User Reaction was generally positive with an average of 8.3. The one '7' rating was concerning the flexibility of the system, and since **FirstSearch** is strictly a

bibliographic citation retrieval tool, its flexibility is inherently narrower that other systems with broader, more numerous utilities. The ratings of the searchers (Group 2) with experience on two computer systems on the Overall User Reaction to the System was mixed with an average of 7.3, and the range in scores being from 5...9. So the ratings indicate that these searchers were generally favorable to the **FirstSearch** system. The broader spread in ratings and higher average in scores given in comparison with Group 1's may indicate a greater selectivity, individuality, and sensitivity that more experienced computer users have when assessing a new computer system. In Group 2, the ratings in reaction to the system had an average of 7.3. In Group 3-4, the section measuring the searcher's ratings to the Overall Reaction to the System showed a fair range from 4...8, with two "Not Applicable" for an average of 6.1. The wider range in scoring, albeit lower average may indicate a more selective and discriminating clientele. The two "Not Applicable" scores may indicate a doubt about that question being applicable to this computer system. For the group with experience on 5-6 computer systems (Group 5-6), their scoring on the Overall Reaction to the System was in the medium range consisting of scores of 4...8, with an average of 6.2. The broader range and lower average in ratings correlate positively with the greater degree of computer system experience, leading to the conclusion that greater experience on computer systems leads to greater discrimination among computer systems offerings. The average of all the groups for Overall User

Reactions was 6.9.

Table 1.4: **OVERALL USER REACTION TO SCREEN**

Question	Rating										Group
	1	2	3	4	5	6	7	8	9	N.A.	
Characters											
Hard to read...easy to read									1		1
								1	6		2
								2	2		3-4
									1		5-6
								3	10		Total=13
Highlighting											
not at all...very helpful								1			1
								1	6		2
								1	3		3-4
									1		5-6
								3	10		Total=13
Layouts											
Not at all...very helpful								1			1
						1	1	4	1		2
							1	2		1	3-4
								1			5-6
						1	2	8	1	1	Total=13
Sequence											
Confusing...clear								1			1
						3	2	2			2
							1	2	1		3-4
								1			5-6
						3	3	6	1		Total=13

Group 1's reaction to the Screen consisted of 8's and one 9 for an average of 8.7. This very highly favorable reaction can be attributed to the fact that this group had very little experience for comparison of computer systems. Group 2's overall Reaction to the Screen had an average of 7.6. Group 3-4's average for this section of questions was 8.2. This group had one "not applicable" response, the only such response from all of the subjects in this section of questions. This response can be attributed to the fact that subjects in this group (Group 3-4) had little basis and

background for comparison and assessment of layouts on the screen. **FirstSearch** is highly specific and specialized for both service and user groups, so uncertainty in responding to such a question is reasonable and bonifide. Group 5-6's average was 8.5. The generally lower average scores of the groups correlates positively with greater experience on more computer systems. The average for of all of the groups was 7.9.

Table 1.5:

OVERALL USER REACTION TO TERMINOLOGY AND SYSTEM INFORMATION-

Question	Rating										Group
	1	2	3	4	5	6	7	8	9	N.A.	
Use of terminology							1				1
throughout system					1		1	2	2	1	2
Inconsistent...consistent					1			1	2		3-4
					1						5-6
					3		2	3	4	1	Total=13
Does the terminology relate well to								1			1
the work you are doing			1	1			1		2	2	2
Unrelated...well related						1	1			2	3-4
					1						5-6
			1	1	1	1	2	1	2	4	Total=13
Messages which appear on								1			1
the screen					1		1	2	3		2
Inconsistent...consistent							1		3		3-4
						1					5-6
					1	1	2	3	6		Total=13
Messages which appear on							1				1
the screen					1		1	1	4		2
confusing...clear							2		2		3-4
			1								5-6
			1		1		4	1	6		Total=13
Does the computer keep you							1				1
informed about what it is					2	1	2		2		2
doing						1	2		1		3-4
Never...always				1							5-6
				1	2	2	5		3		Total=13
Error messages									1		1
Unhelpful...helpful					1	1	1	2	1	1	2
					1			1	1	1	3-4
								1			5-6
					2	1	1	4	3	2	Total=13

In the Terminology and System Information section for rating the computer system, there was a wider range of rating measures for the entire Group 1 volunteers,-- 7, 8, 9, for an average of 7.7,

indicating a generally favorable reaction to the utility of the screen. The group with experience on 2 computer systems rated the terminology and System Information was rated beneficially-- the range consisting of scores from 3...9, for an average of 7.2. The lower scores (3 & 4's) were concerned with the fit of the terminology used to the work being done, indicating that when a computer user, no matter how experienced, is set to perform computer work with which they have little or no intellectual investment, they tend to be a bit more confused and error-prone than when they totally understand the subject matter of the task they are performing. The Terminology and System Information section for Group 3-4 consisted of a range from 5...9, with an average of 7.5, with three "Not Applicable". The "Not Applicable" scores may indicate a perception that the novice users did not fully grasp the potential or even the benefit of such a system for searching-out bibliographic citations. The rating of Group 5-6 in the Terminology and System Information fell in the medium range consisting of a range from 3...8, with an average of 5.2. Since they purported to be more computer experienced they may have rated the system more rigorously. The average for all of the subjects was 6.9.

Table 1.6: **OVERALL USER REACTION TO LEARNING**

Question	Rating										Group
	1	2	3	4	5	6	7	8	9	N.A.	
Learning to operate								1			1
the system				1		1	1	2	2		2
Difficult...easy		1					2	1			3-4
						1					5-6
		1		1		2	3	4	2		Total=13
Exploration of features							1				1
by trial and error					1	1	1	1	2	1	2
Discouraging...				1		1	2				3-4
encouraging			1								5-6
			1	1	1	2	4	1	2	1	Total=13
Remembering names and								1			1
use of commands			1	1	1	2	1	1			2
Difficult...easy						1	1	1	1		3-4
				1							5-6
			1	2	1	3	2	3	1		Total=13
Can tasks be performed								1			1
in a straight forward					1	1	4		1		2
manner							1	1	2		3-4
never...always						1					5-6
					1	2	5	2	3		Total=13
Help messages on screen								1			1
Confusing...clear						1	2	1	3		2
						1	1		1	1	3-4
							1				5-6
						2	4	2	4	1	Total=13
Supplemental reference material									1		1
Confusing...clear					2		2		2	1	2
						1		1		2	3-4
					1						5-6
					3	1	2	1	3	3	Total=13

Group 1 rated the learning aspect of **FirstSearch** very high, ranging from 7...9, with an average of 8.0, indicating that the **FirstSearch** system is user friendly and helps novice users in the first-time search process. The seven was related to trial and error learning and since only one search was experienced by the searcher, trial and error learning was limited, so that a low score

was relevant. In Group 2, the ratings are more spread-out, but are still highly positive to the system's aid-giving capabilities. The score's range being from 3...9, with four "Not Applicable", giving an average of 7.3. The wider range in scores indicating that learning even on a "user-friendly" system is still highly individualistic and no computer system can encompass the entire gamut of learning strategies necessary to fit all learning styles to a 'T'. In group 3-4 the range is wider, varying from 2...9, with three "Not Applicables" for an average of 7.5. The greater number of "Not Applicables" indicating that those questions were not relevant to the searchers and hence to the purpose of this investigation. The questions dealt with "help messages" on the screen and Supplemental Reference Material. "Help messages" were not being tested-for and "Supplemental Reference Material(s)" were not being solicited, so that the "N. A."s were totally well placed. For Group 5-6, the ratings were more clustered being from 3...7, with an average of 5.2, indicating that in fairly experienced computer users, the aspect of learning from the system is more apt to occur with experience than in users who are relatively inexperienced and requiring more help from the computer system itself. The average for all of the subjects was 7.0.

The ease of learning the **FirstSearch** system is critical, for expeditious searching on the system. Since much of the ability to construct a successful search is gained from past experience, it is necessary for the user to learn from the searching they have done

and to learn as they do it.[21]

Table 1.7: **OVERALL USER REACTION TO SYSTEM CAPABILITIES**

Question	Rating										Group
	1	2	3	4	5	6	7	8	9	N.A.	
System Speed								1			1
Too slow...fast enough						1	1		5		2
								4			3-4
									1		5-6
						1	1	5	6		Total=13
How reliable is the system							1				1
Very unreliable...very reliable						1	2	1	3		2
							1	1	1	1	3-4
								1			5-6
						1	4	3	4	1	Total=13
System tend to be									1		1
Noisy...quiet					1			1	5		2
								1	3		3-4
									1		5-6
					1			2	10		Total=13
Correcting your mistakes									1		1
Difficult...easy		1			1		1	1	1	2	2
				1			1	1	1		3-4
				1							5-6
		1		2	1		2	2	3	2	Total=13
Are the needs of both								1			1
experienced and inexperienced					1	1	3	1	1		2
users taken into consideration						2	1		1		3-4
Never...Always			1								5-6
			1		1	3	4	2	2		Total=13

The System Capabilities measurements for Group 1 was high, but had a narrow range consisting of from 7...9, with an average rating of 8.2. The System Capabilities for group 2 were also rated high with a much broader range indicating a more varied response in perception of the system, the range encompassing sores of 2...9,

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[21] Shaw, Debora, "Nine Sources of Problems for Novice Online Searchers", Online Review, Vol. 10, no. 5, pp. 295-303, 1986.

and two "N.A."s, for an average of 8.6. Again, since **FirstSearch** is a bibliographic retrieval system its capabilities are inherently less diverse than many other computer systems, this is a very high score for such a specific computer system. Group 3-4 contained a range of scores from 4...9, with an average of 7.7, with three "Not Applicable". The "N.A."s may indicate again that the questions about "help messages" and "supplemental reference material" were not germane to the search they performed, which they were not. Group 5-6 rated the System Capabilities mixed, the range of 3...9 with an average of 6.6, indicating the varied perception of the systems capabilities. The average score was positively correlated with the degree of experience claimed by the novice searcher. Experience seems to predispose searchers to make more critical judgements of the computer system they are using. The overall average for all of the groups was 7.9 for this section of questions.

WRITTEN COMMENTS

The searcher in Group 1 had written comments concerning his experience with the **FirstSearch** set of databases, he thought that the **FirstSearch** system "was very beneficial to learn" and "easy to use" and that he might very well "use it again if he would need references for a paper". The searchers in Group 2 had written comments that were indicative of how they perceived **FirstSearch**. Most (86%) indicated that they found the search easy to perform and that the system facilitates learning about it while operating it. One person complained about not being able to backspace to correct

typing errors. In the Written Comments section 75% of Group 3-4 complained about the intimidating aspect of logging-on with the masked Passwords and Authorization keys, but they were favorable in their overall assessment of **FirstSearch** system of Databases. There were no written comments from the searcher in Group 5's encounter with the system.

TABLE 1.8: AVERAGES OF GROUPS

Groups	1	2	3-4	5-6	X
Overall Reaction to System	8.3	7.3	6.1	6.2	6.9
Reaction to Screen	8.7	7.6	8.2	8.5	7.9
Reaction to Technology and System Information	7.7	7.2	7.5	5.2	6.9
Reaction to Learning	8.0	7.3	7.5	5.2	7.0
Reaction to System Capabilities	8.2	8.6	7.7	6.6	7.9

Although there are no significant statistical findings for this table, there are qualitative analyses which are relevant to this research. Generally speaking, the more experience on computer systems a group had, the more discriminating were their analysis of their use of the **FirstSearch** product. The most stringent of these analyses was the section of questions concerned with learning. Learning, especially in regards to novice users is an extremely important factor for a computer product provider. The programming must be computer-friendly (read conducive to learning) so that novice users are successful in their initial use and will continue

using the product. The novice users in this research were all successful in their use of the **FirstSearch** Program and thought positively of it.

SUMMARY/CONCLUSIONS

From the data gleaned during this investigation, it seems that the **FirstSearch** systems has a relatively user-friendly computer interface.

Perhaps the most telling question on the **QUIS** questionnaire was the last question in reference to how well the system satisfied the needs of both an experienced and inexperienced user.

Group 1, the most computer system ignorant searcher rated **FirstSearch** an 8. A positive assessment of the "user-friendliness' of the system. Group 2, consisting of seven users with experience on 2 computer system rated the **FirstSearch** system from 5...9, with an average of 7.0. Signifying that as a group they rated it positively on user-friendliness. Group 3-4 rated this questionnaire with 5...9 for a group average of 7.7. Group 5-6 ratings was one 3. Indicating perhaps, that more experience is correlated with more discrimination when dealing with computer systems. Comparison of the groups with each other yields little worthwhile data, except that as a whole the entire group on average ratings were 6.8, which is a positive indication of searcher appreciation.

The total of all averages from all of the questions and all of the sections from the **QUIS** questionnaire for all of the groups was

7.0, indicating a moderately strong approval rating for the **FirstSearch** system.

There are frequently a host of variables which can affect the processing and results of an investigation, especially one involving human subjects. These extraneous variables are often unknown at the time of the research. Usually the effects of these extraneous variables are negative in nature.[22] Some of the examples of the extraneous variables and cause for further research in this analysis of the **FirstSearch** set of databases may be:

1). the basic problem of a novice searcher searching for subject material with which they have had no previous contact and have no conceptualization of what they are needing/ looking for/ etc. could result in disinterest, confusion, and/or increased inability to follow the directions in the computer program.

2). The problem of stress, typing skills, etc. affecting how an individual functions in an experimental environment by increasing nervousness, frustration, inability to follow logical directions, etc., resulting in a poor performance on an otherwise easy computer exercise.

3). the functioning of a relatively new computer system where all of the functions of the system may not yet be simplistic enough for novice searchers. A novice searcher who finds a computer program confusing or intimidating may not pursue further work (and learning and thereby refining of computer skills) on that same program.

It is conceivable that any one or all of these extraneous variables could have been operating in this investigation, and possibly more as yet undiscovered effects of other unknown factors. Despite these potentially disabling effects, **FirstSearch** still scored very high in "user-friendliness". In conclusion, based on

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[22] Donald,Ary, Lucy Jacobs, Asgar Razevieh, "Introduction to Research in Education, 4th. ed., Fort Worth: Holt, Rinehart, and Winston Inc., 1990, p. 311-317.

this small amount of qualitative data and despite the inherent biases in the qualitative research, the data indicates that the **FirstSearch** set of Databases as a system constitutes a novice-user-friendly system for bibliographic citation searching.

RECOMMENDATIONS

Heckel noted that the best designed user interface will be the product of a designer who has a clear picture of the most likely end-use[23] and the foremost concern of a software designer should be clear communication.[24] Since the end-user in this investigation was a novice searcher, clear, concise and simple directions are of the utmost importance. In addition, the research process and the results reviewed suggest several options for a network such as OCLC to better serve their clientele.

1) Make sure the system runs as smoothly as possible, all keys and their functions are delineated clearly, no obscure functions occurring because of miscued keys. A novice searcher is often a young and inept keyboard user, it is important that they are not penalized for a lack of finger dexterity.

2) In offering subject area decisions, give examples of databases within that area rather than requiring them to make educated or likely guesses. It will only confuse them and make them more unsure of their own judgment in the search process.

3) Expedite the printing and downloading capabilities within your system, perusal should be at the user's discretion and not take-up valuable user time and library facilities.

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[23] Heckel, Paul, The Elements of Friendly Software Design. New York: Warner Books, 1984.

[24] Zink, Steven D., "Toward More Critical Reviewing and Analyses of CD-ROM User Software Interfaces", CD-ROM Professional, January 1991, p. 18.

4) Don't try to sell your wares where they are not necessarily needed. Most of the **FirstSearch** databases are available on CD-ROM at little or no cost to the searcher, the currency of **FirstSearch** is the commodity which should be emphasized and be the selling point. There is little point in creating a group of users which are antagonistic to your system because they used a system and spent their money on goods which did not fulfill their needs, as Puttpithakporn (1990) observed[25].

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[25] Puttpithakporn, Somporn,"Interface Design and User Problems and Errors: A Case Study of Novice Searchers", RQ, Winter 1990, p. 195.

SCRIPT FOR RECRUITED VOLUNTEERS Appendix A

I want to do research on **FIRSTSEARCH** on the IBM computer. I want to do this because user studies are important for the smooth implementation of computer systems in libraries and information centers. I would like you to take part in this project. If you decide to do this, you will be asked to perform a search of the **FIRSTSEARCH** set of databases on the IBM computer here at Alden Library. As you conduct your search you will be observed. You will also be asked to think aloud, and you will be tape recorded. After the search, you will be asked to complete a questionnaire. This entire process will take about an hour.

The risks associated with this project are minimal. The experience should not be unpleasant unless you are very frightened of computers. As with the use of any computer, exposure to hazardous rays is possible.

Your name and phone number will be used only to set up the search time. All information will be held in confidence. Audio tapes will be erased after transcription. You may listen to the audio tapes if you wish.

If you take part in this project you will gain experience with IBM applications, with **FIRSTSEARCH** searching, and with performing a reference search. Taking part in this project is entirely up to you, no one will hold it against you if you decide not to do it. If you take part, you may withdraw at any time without penalty of any kind. There will be a stipend of $10.00 if you, the volunteer, complete the search and questionnaire.

If you want to know more about this research project, please call me at 593-5724 or you may contact Dr. Carl Franklin at 1-292-7746. This project has been approved by Kent State University rule's for research, please call Dr. Eugene Wenninger, telephone (216)-672-2070.

You will get a copy of this consent form.

Sincerely,

C. Crysteen Cooper
Graduate Student
School of Library and Information Science

TRANSCRIPTIONS OF SEARCHES Appendix B

1/22/93	**JUSTIN**
12:10	On Search
12:11	"let's see, **Fsearch** is the next direction".
12:12	"Oh damn, lets get this blasted password right".
12:13	"**ERIC** is a social sciences database".
12:14	"Mmmm...Obesity and youth".
12:15	Some confusion over hitting "return" after every command. Generally read/studied screen for a minute or so before committing any action.
1/22/93	**GLENN**
2:10	On Search
2:11	"Is **ERIC** a humanities database, evidently not (after reading list of databases included in Humanities area databases), lets try Social Sciences..."
2:12	Mis-searched "su:obesity and young people"-no hits. Researched under correct nomenclature/search terminology. accompanied by various curse words.
2:14	Mis-punctuated "limiting of 1990-1993 as 1990...1993." So had to re-search. Again generally studied/read screen for a minute or so before taking any action.
1/23/93	**JESSICA**
1:30	Logged-on easily, little or no problems/questions.
1:32	"Lets see Social Sciences Area was where she (experimenter) told me to find **ERIC**".
1:34	"Damn...su: Obesity and Youth and for second search...L.1 and 1990-1993, that should be right."
1:35	Search Completed.
1/24/93	**CHRIS**
1:55	Logged on quickly and easily.
1:56	"Mmmm... lets try humanities for area, no, I'll try Social Sciences, yes, that's right." Chose wrong topic area but self-corrected.
1:57	Mistyped Youth and Obesity, system would not backspace to allow for corrections, so had to relog-on and perform another search.
2:05	Search completed correctly.

1/24/93	**CINDY**
3:10	"damn, password didn't work, oops, I used the wrong password rather than the authorization number", searcher was confused by the long wait for OCLC to correct prompt for a new authorization cue.
3:12	Mis-searched due to incorrect spelling in the search phrase, system would not backspace to allow for corrections, so had to perform two searches.
3:15	Finished search
1/24/93	**KIRSTEN**
4:10	logged-on correctly, although mistyped-in password, but system allowed backspacing to make corrections.
4:11	"lets see, **fsearch**, then my own password and authorization codes".
4:15	Search completed with few or no hesitations.
1/25/93	**MICHELLE**
12:30	Logged-on o.k.
12:34	"Mmm, how to get only years wanted, yes, use **L.1 and then 1990-1993**."
12:35	"lets see to log-off, **BYE** then return and I'm out". Search completed, no problems, some hesitation in performing limiting function.
1/25/93	**JODI**
1:40	logged-on, some question in choosing "Access Internet" from the main menu. "What were those directions again? Oh yes, "Access Internet".
1:43	"Uhh...Obesity and Youth should do it". Misspelled search items but system allowed backspacing to make corrections.
1:44	"To make time-span limits...let's see the screen says to type **L then 1 then 1990-1993**.
1:45	Search completed, "how to get out of this thing", I guess, **BYE**".

1/25/93		**SANGEETA**
2:30		Logged on, hesitation due to lack of "computer ease", hadn't used a computer very much. "Oh drat, how to get computer to do directions, oh yes, she (researcher) said to use Return as Function Key".
2:35		"**BYE** to get out of it", Logged off, search completed.
1/26/93		**LEAH**
1:04		Logged-on, confused in which password to use, "**fsearch**" of Card password:. No other problems once in system.
1:09		Search completed. "Oh that was easy."
1/26/93		**ELLIOTT**
3:10		Logged-on, mistyped "**Fsearch**", so had to escape to quit **FirstSearch**, then re-enter.
3:11		"Is **ERIC** in humanities or Social Sciences, let's try Social Sciences, yes it's there."
3:15		Search completed.
1/27/93		**NATALIE**
12:05		Logged-on, took time to re-read search sheet, direction sheets on screen before giving any search commands.
12:10		logged-off, search completed and successful.
1/27/93		**STELLA**
3:10		Logged-on.
3:11		"How did it say to limit searches, Oh yes **L,then 1 then 1990-1993**...," some confusion with limit selection, all else o.k.
3:15		Logged-off, search completed and successful.

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